

B5768..ST25.txt
SEQUENCE LISTING

<110> DRUILHE, Pierre

<120> GLURP-MSP3 FUSION PROTEIN, IMMUNOGENIC COMPOSITIONS AND MALARIAL VACCINES CONTAINING IT

<130> B5768 - AD/VMA/VG

<140> New US Patent Application

<141> 2003-10-24

<160> 7

<170> PatentIn version 3.1

<210> 1

<211> 491

<212> PRT

<213> P. Falciparum

<220>

<221> misc_feature

<222> (1)..(491)

<223> GLURP amino acids 24 - 514

<400> 1

Lys Thr Asn Thr Ser Glu Asn Arg Asn Lys Arg Ile Gly Gly Pro Lys
1 5 10 15

Leu Arg Gly Asn Val Thr Ser Asn Ile Lys Phe Pro Ser Asp Asn Lys
20 25 30

Gly Lys Ile Ile Arg Gly Ser Asn Asp Lys Leu Asn Lys Asn Ser Glu
35 40 45

Asp Val Leu Glu Gln Ser Glu Lys Ser Leu Val Ser Glu Asn Val Pro
50 55 60

Ser Gly Leu Asp Ile Asp Asp Ile Pro Lys Glu Ser Ile Phe Ile Gln
65 70 75 80

Glu Asp Gln Glu Gly Gln Thr His Ser Glu Leu Asn Pro Glu Thr Ser
85 90 95

Glu His Ser Lys Asp Leu Asn Asn Asn Asp Ser Lys Asn Glu Ser Ser
100 105 110

Asp Ile Ile Ser Val Asn Asn Lys Ser Asn Lys Val Gln Asn His Phe
115 120 125

Glu Ser Leu Ser Asp Leu Glu Leu Leu Glu Asn Ser Ser Gln Asp Asn
130 135 140

Leu Asp Lys Asp Thr Ile Ser Thr Glu Pro Phe Pro Asn Gln Lys His
145 150 155 160

B5768..ST25.txt

Lys Asp Leu Gln Gln Asp Leu Asn Asp Glu Pro Leu Glu Pro Phe Pro
 165 170 175
 Thr Gln Ile His Lys Asp Tyr Lys Glu Lys Asn Leu Ile Asn Glu Glu
 180 185 190
 Asp Ser Glu Pro Phe Pro Arg Gln Lys His Lys Lys Val Asp Asn His
 195 200 205
 Asn Glu Glu Lys Asn Val Phe His Glu Asn Gly Ser Ala Asn Gly Asn
 210 215 220
 Gln Gly Ser Leu Lys Leu Lys Ser Phe Asp Glu His Leu Lys Asp Glu
 225 230 235 240
 Lys Ile Glu Asn Glu Pro Leu Val His Glu Asn Leu Ser Ile Pro Asn
 245 250 255
 Asp Pro Ile Glu Gln Ile Leu Asn Gln Pro Glu Gln Glu Thr Asn Ile
 260 265 270
 Gln Glu Gln Leu Tyr Asn Glu Lys Gln Asn Val Glu Glu Lys Gln Asn
 275 280 285
 Ser Gln Ile Pro Ser Leu Asp Leu Lys Glu Pro Thr Asn Glu Asp Ile
 290 295 300
 Leu Pro Asn His Asn Pro Leu Glu Asn Ile Lys Gln Ser Glu Ser Glu
 305 310 315 320
 Ile Asn His Val Gln Asp His Ala Leu Pro Lys Glu Asn Ile Ile Asp
 325 330 335
 Lys Leu Asp Asn Gln Lys Glu His Ile Asp Gln Ser Gln His Asn Ile
 340 345 350
 Asn Val Leu Gln Glu Asn Asn Ile Asn Asn His Gln Leu Glu Pro Gln
 355 360 365
 Glu Lys Pro Asn Ile Glu Ser Phe Glu Pro Lys Asn Ile Asp Ser Glu
 370 375 380
 Ile Ile Leu Pro Glu Asn Val Glu Thr Glu Glu Ile Ile Asp Asp Val
 385 390 395 400
 Pro Ser Pro Lys His Ser Asn His Glu Thr Phe Glu Glu Glu Thr Ser
 405 410 415
 Glu Ser Glu His Glu Glu Ala Val Ser Glu Lys Asn Ala His Glu Thr
 420 425 430

B5768..ST25.txt

Val Glu His Glu Glu Thr Val Ser Gln Glu Ser Asn Pro Glu Lys Ala
435 440 445

Asp Asn Asp Gly Asn Val Ser Gln Asn Ser Asn Asn Glu Leu Asn Glu
450 455 460

Asn Glu Phe Val Glu Ser Glu Lys Ser Glu His Glu Pro Ala Glu Asn
465 470 475 480

Glu Glu Ser Ser Leu Glu Glu Gly His His Glu
485 490

<210> 2
<211> 169
<212> PRT
<213> P. Falciparum

<220>
<221> MISC_FEATURE
<222> (1)..(169)
<223> MSP3 amino acids 212 - 380

<400> 2

Lys Glu Ala Ser Ser Tyr Asp Tyr Ile Leu Gly Trp Glu Phe Gly Gly
1 5 10 15

Gly Val Pro Glu His Lys Lys Glu Glu Asn Met Leu Ser His Leu Tyr
20 25 30

Val Ser Ser Lys Asp Lys Glu Asn Ile Ser Lys Glu Asn Asp Asp Val
35 40 45

Leu Asp Glu Lys Glu Glu Glu Ala Glu Glu Thr Glu Glu Glu Glu Leu
50 55 60

Glu Glu Lys Asn Glu Glu Glu Thr Glu Ser Glu Ile Ser Glu Asp Glu
65 70 75 80

Glu Glu Glu Glu Glu Glu Glu Lys Glu Glu Glu Asn Glu Lys Lys Lys
85 90 95

Glu Gln Glu Lys Glu Gln Ser Asn Glu Asn Asn Asp Gln Lys Lys Asp
100 105 110

Met Glu Ala Gln Asn Leu Ile Ser Lys Asn Gln Asn Asn Asn Glu Lys
115 120 125

Asn Val Lys Glu Ala Ala Glu Ser Ile Met Lys Thr Leu Ala Gly Leu
130 135 140

Ile Lys Gly Asn Asn Gln Ile Asp Ser Thr Leu Lys Asp Leu Val Glu
145 150 155 160

B5768..ST25.txt

Glu Leu Ser Lys Tyr Phe Lys Asn His
165

<210> 3
<211> 647
<212> PRT
<213> Artificial Sequence

<220>
<223> protein

<220>
<221> MISC_FEATURE
<222> (1)..(647)
<223> GLURP MSP3 fusion protein

<400> 3

Thr Ser Glu Asn Arg Asn Lys Arg Ile Gly Gly Pro Lys Leu Arg Gly
1 5 10 15

Asn Val Thr Ser Asn Ile Lys Phe Pro Ser Asp Asn Lys Gly Lys Ile
20 25 30

Ile Arg Gly Ser Asn Asp Lys Leu Asn Lys Asn Ser Glu Asp Val Leu
35 40 45

Glu Gln Ser Glu Lys Ser Leu Val Ser Glu Asn Val Pro Ser Gly Leu
50 55 60

Asp Ile Asp Asp Ile Pro Lys Glu Ser Ile Phe Ile Gln Glu Asp Gln
65 70 75 80

Glu Gly Gln Thr His Ser Glu Leu Asn Pro Glu Thr Ser Glu His Ser
85 90 95

Lys Asp Leu Asn Asn Asn Gly Ser Lys Asn Glu Ser Ser Asp Ile Ile
100 105 110

Ser Glu Asn Asn Lys Ser Asn Lys Val Gln Asn His Phe Glu Ser Leu
115 120 125

Ser Asp Leu Glu Leu Leu Glu Asn Ser Ser Gln Asp Asn Leu Asp Lys
130 135 140

Asp Thr Ile Ser Thr Glu Pro Phe Pro Asn Gln Lys His Lys Asp Leu
145 150 155 160

Gln Gln Asp Leu Asn Asp Glu Pro Leu Glu Pro Phe Pro Thr Gln Ile
165 170 175

His Lys Asp Tyr Lys Glu Lys Asn Leu Ile Asn Glu Glu Asp Ser Glu
180 185 190

B5768..ST25.txt

Pro Phe Pro Arg Gln Lys His Lys Lys Val Asp Asn His Asn Glu Glu
 195 200 205
 Lys Asn Val Phe His Glu Asn Gly Ser Ala Asn Gly Asn Gln Gly Ser
 210 215 220
 Leu Lys Leu Lys Ser Phe Asp Glu His Leu Lys Asp Glu Lys Ile Glu
 225 230 235 240
 Asn Glu Pro Leu Val His Glu Asn Leu Ser Ile Pro Asn Asp Pro Ile
 245 250 255
 Glu Gln Ile Leu Asn Gln Pro Glu Gln Glu Thr Asn Ile Gln Glu Gln
 260 265 270
 Leu Tyr Asn Glu Lys Gln Asn Val Glu Glu Lys Gln Asn Ser Gln Ile
 275 280 285
 Pro Ser Leu Asp Leu Lys Glu Pro Thr Asn Glu Asp Ile Leu Pro Asn
 290 295 300
 His Asn Pro Leu Glu Asn Ile Lys Gln Ser Glu Ser Glu Ile Asn His
 305 310 315 320
 Val Gln Asp His Ala Leu Pro Lys Glu Asn Ile Ile Asp Lys Leu Asp
 325 330 335
 Asn Gln Lys Glu His Ile Asp Gln Ser Gln His Asn Ile Asn Val Leu
 340 345 350
 Gln Glu Asn Asn Ile Asn Asn His Gln Leu Glu Pro Gln Glu Lys Pro
 355 360 365
 Asn Ile Glu Ser Phe Glu Pro Lys Asn Ile Asp Ser Glu Ile Ile Leu
 370 375 380
 Pro Glu Asn Val Glu Thr Glu Glu Ile Ile Asp Asp Val Pro Ser Pro
 385 390 395 400
 Lys His Ser Asn His Glu Thr Phe Glu Glu Glu Thr Ser Glu Ser Glu
 405 410 415
 His Glu Glu Ala Val Ser Glu Lys Asn Ala His Glu Thr Val Glu His
 420 425 430
 Glu Glu Thr Val Ser Gln Glu Ser Asn Pro Glu Lys Ala Asp Asn Asp
 435 440 445
 Gly Asn Val Ser Gln Asn Ser Asn Asn Glu Leu Asn Glu Asn Glu Phe
 450 455 460

B5768..ST25.txt

Val Glu Ser Glu Lys Ser Glu His Glu Ala Arg Ser Lys Ala Lys Glu
465 470 475 480

Ala Ser Ser Tyr Asp Tyr Ile Leu Gly Trp Glu Phe Gly Gly Gly Val
485 490 495

Pro Glu His Lys Lys Glu Glu Asn Met Leu Ser His Leu Tyr Val Ser
500 505 510

Ser Lys Asp Lys Glu Asn Ile Ser Lys Glu Asn Asp Asp Val Leu Asp
515 520 525

Glu Lys Glu Glu Glu Ala Glu Glu Thr Glu Glu Glu Glu Leu Glu Glu
530 535 540

Lys Asn Glu Glu Glu Thr Glu Ser Glu Ile Ser Glu Asp Glu Glu Glu
545 550 555 560

Glu Glu Glu Glu Glu Lys Glu Glu Glu Asn Glu Lys Lys Lys Glu Gln
565 570 575

Glu Lys Glu Gln Ser Asn Glu Asn Asn Asp Gln Lys Lys Asp Met Glu
580 585 590

Ala Gln Asn Leu Ile Ser Lys Asn Gln Asn Asn Asn Glu Lys Asn Val
595 600 605

Lys Glu Ala Ala Glu Ser Ile Met Lys Thr Leu Ala Gly Leu Ile Lys
610 615 620

Gly Asn Asn Gln Ile Asp Ser Thr Leu Lys Asp Leu Val Glu Glu Leu
625 630 635 640

Ser Lys Tyr Phe Lys Asn His
645

<210> 4
<211> 1941
<212> DNA
<213> Artificial sequence

<220>
<223> DNA

<400> 4
acaagtgaga atagaaataa acgaatcggg ggtcctaaat taaggggtaa tgttacaagt 60
aatataaagt tcccatcaga taacaaagggt aaaattataa gaggttcgaa tgataaactt 120
aataaaaact ctgaagatgt tttagaacaa agcgaaaaat cgcttggttc agaaaaatgtt 180
cctagtggat tagatataga tgatatccct aaagaatcta tttttattca agaagatcaa 240
gaagggtcaaa ctcatctga attaaatcct gaaacatcag aacatagtaa agatttaaatt 300

B5768..ST25.txt

```

aataatggtt caaaaaatga atctagtgat attatttcag aaaataataa atcaaataaa 360
gtacaaaatc attttgaatc attatcagat ttagaattac ttgaaaattc ctcacaagat 420
aatttagaca aagatacaat ttcaacagaa ccttttccta atcaaaaaca taaagactta 480
caacaagatt taaatgatga accttttagaa cccttttccta cacaataaca taaagattat 540
aaagaaaaaa atttaataaa tgaagaagat tcagaaccat ttcccagaca aaagcataaa 600
aaggtagaca atcataatga agaaaaaaac gtatttcatg aaaatgggtc tgcaaagggt 660
aatcaaggaa gtttgaaact taaatcattc gatgaacatt taaaagatga aaaaatagaa 720
aatgaaccac ttgttcatga aaatttatcc ataccaaatg atccaataga acaaattatta 780
aatcaacctg aacaagaaac aaatatccag gaacaattgt ataatgaaaa acaaatgttt 840
gaagaaaaac aaaattctca aataccttcg ttagatttaa aagaaccaac aaatgaagat 900
attttacca atcataatcc attagaaaat ataaaaacaa gtgaatcaga aataaatcat 960
gtacaagatc atgcgctacc aaaagagaat ataatagaca aacttgataa tcaaaaagaa 1020
cacatcgatc aatcacaaac taatataaat gtattacaag aaaataacat aaacaatcac 1080
caattagaac ctcaagagaa acctaataat gaatcgtttg aacctaaaaa tatagattca 1140
gaaattattc ttcctgaaaa tgttgaaaca gaagaaataa tagatgatgt gccttcccct 1200
aaacattcta accatgaaac atttgaagaa gaaacaagt gaaatctgaaca tgaagaagcc 1260
gtatctgaaa aaaatgcccc cgaaactgtc gaacatgaag aaactgtgtc tcaagaaagc 1320
aatcctgaaa aagctgataa tgatggaaat gtatctcaaa acagcaacaa cgaattaaat 1380
gaaaatgaat tcgttgaatc ggaaaaaagc gagcatgaag caagatctaa agcaaaagaa 1440
gcttctagtt atgattatat tttagggttg gaatttggag gaggcgttcc agaacacaaa 1500
aaagaagaaa atatgttatc acatttatat gtttcttcaa aggataagga aaatatatct 1560
aaggaaaaatg atgatgtatt agatgagaag gaagaagagg cagaagaaac agaagaagaa 1620
gaacttgaag aaaaaaatga agaagaaaca gaatcagaaa taagtgaaga tgaagaagaa 1680
gaagaagaag aagaaaagga agaagaaaat gaaaaaaaaa aagaacaaga aaaagaacaa 1740
agtaatgaaa ataatgatca aaaaaaagat atggaagcac agaatttaat ttctaaaaac 1800
cagaataata atgagaaaaa cgtaaaagaa gctgctgaaa gcatcatgaa aactttagct 1860
ggtttaatac agggaaataa tcaaatagat tctaccttaa aagatttagt agaagaatta 1920
tccaaatatt ttaaaaaatca t 1941

```

```

<210> 5
<211> 27
<212> PRT
<213> P. Falciparum

```

```

<220>
<221> MISC_FEATURE
<222> (1)..(27)
<223> MSP3b

```

B5768..ST25.txt

<400> 5

Ala Lys Glu Ala Ser Ser Tyr Asp Tyr Ile Leu Gly Trp Glu Phe Gly
 1 5 10 15

Gly Gly Val Pro Glu His Lys Lys Glu Glu Asn
 20 25

<210> 6
 <211> 41
 <212> PRT
 <213> P. Falciparum

<220>
 <221> MISC_FEATURE
 <222> (1)..(41)
 <223> MSP3d

<400> 6

Met Leu Ser His Leu Tyr Val Ser Ser Lys Asp Lys Glu Asn Ile Ser
 1 5 10 15

Lys Glu Asn Asp Asp Val Leu Asp Glu Lys Glu Glu Glu Ala Glu Glu
 20 25 30

Thr Glu Glu Glu Glu Leu Glu Glu Lys
 35 40

<210> 7
 <211> 188
 <212> PRT
 <213> P. Falciparum

<220>
 <221> MISC_FEATURE
 <222> (1)..(188)
 <223> MSP3a to MSP3f

<400> 7

Tyr Glu Lys Ala Lys Asn Ala Tyr Gln Lys Ala Asn Gln Ala Val Leu
 1 5 10 15

Lys Ala Lys Glu Ala Ser Ser Tyr Asp Tyr Ile Leu Gly Trp Glu Phe
 20 25 30

Gly Gly Gly Val Pro Glu His Lys Lys Glu Glu Asn Met Leu Ser His
 35 40 45

Leu Tyr Val Ser Ser Lys Asp Lys Glu Asn Ile Ser Lys Glu Asn Asp
 50 55 60

Asp Val Leu Asp Glu Lys Glu Glu Glu Ala Glu Glu Thr Glu Glu Glu
 65 70 75 80

B5768..ST25.txt

Glu Leu Glu Glu Lys Asn Glu Glu Glu Thr Glu Ser Glu Ile Ser Glu
85 90 95

Asp Glu Glu Glu Glu Glu Glu Glu Glu Lys Glu Glu Glu Asn Asp
100 105 110

Lys Lys Lys Glu Gln Glu Lys Glu Gln Ser Asn Glu Asn Asn Asp Gln
115 120 125

Lys Lys Asp Met Glu Ala Gln Asn Leu Ile Ser Lys Asn Gln Asn Asn
130 135 140

Asn Glu Lys Asn Val Lys Glu Ala Ala Glu Ser Ile Met Lys Thr Leu
145 150 155 160

Ala Gly Leu Ile Lys Gly Asn Asn Gln Ile Asp Ser Thr Leu Lys Asp
165 170 175

Leu Val Glu Glu Leu Ser Lys Tyr Phe Lys Asn His
180 185